Clouds Second Report: Cumulus Humilis

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1. Introduction

The goal of this report is to describe the process and background behind an image of cumulus clouds as required for the second cloud photograph assignment of the course "Flow Visualization" (ATLS 5519).

2. About the Image

This image was taken on October 22 at 5:46pm in Boulder with the camera facing north. The background is comprised of a blue sky with trees and light poles visible along the bottom edge of the image. This photograph was captured at ground level from the edge of a field so as to avoid the many trees in the area.

3. Cloud Characteristics

Most of the clouds captured in this photograph can be classified as cumulus clouds. These clouds are usually flat at the base, and often described as resembling balls of cotton [1]. Cumulus clouds typically occur at approximately 7,000 feet above ground level [2]. Cumulus clouds are classified into four different species: cumulus *fractus, humilis, mediocris,* and *congestus*. Cumulus fractus clouds are distinguished by a "ragged" appearance, while the other three types remain fluffy, differing only in vertical height. Of these, the cumulus humilis has the shortest vertical height, followed by cumulus mediocris and congestus [3].

Many of the clouds toward the bottom of the image bear the closest resemblance to the *cumulus humilis* species, as this species of cumulus cloud has a short vertical height, but still fluffy in appearance. The cloud in the middle of the image, however, appears to more closely resemble the cumulus mediocris, as it appears to have more vertical height than the rest.

From a meteorological perspective, *cumulus humilis* clouds are usually indicative of clear and fair weather. However, they are capable of forming into *cumulus mediocris* or *congestus clouds* as more water droplets condense, which can bring about precipitation and storms [4].

According to the skew-T diagram in Figure 2 (below), the atmosphere was stable when this picture was taken, with a Convective Available Potential Energy (CAPE) value of 0.00 J/kg.

5. Photographic Technique

The following camera settings were used to capture the photograph:

Camera and Image: iPhone 7, 4032 x 3024 pixels (w x h)

Focal length: 4 mm

Exposure settings. ISO 20, shutter speed 1/1100 sec, f-number of 1.8.

Minimal editing was conducted to produce the final version. To improve the color quality, saturation and exposure were adjusted.



Figure 1. Final edited image, with adjustments made to saturation and exposure.



Figure 2. Original unedited image.



Figure 3. Skew-T diagram showing that the atmosphere was stable at the time the image was taken.

6. Image Commentary

From a visual standpoint, I appreciate how well the clouds stand out against the backdrop of the blue sky. The angle of the image, as well as the trees in the distant background, cast the clouds in a dramatic and imposing light. The three field lights are dwarfed in size by the clouds, emphasizing the great size of the clouds. Contrails from two airplanes run perpendicular to and behind the large cloud in the center of the image, and behind the contrails, clouds even higher up in the atmosphere can be seen. This "cloud layering" adds a great deal of depth to the image. Finally, as this image was taken near sunset, some warm hues are visible near the bottom of the image, while cooler hues are visible near the top.

References

[1] "Cloud Classification and Characteristics". National Oceanic and Atmospheric Administration. Retrieved 18 October 2012.

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[3] "WMO classification of clouds" (PDF). World Meteorological Organization. Retrieved 18 October 2012.

[4] "Weather Glossary". The Weather Channel. Archived from the original on 17 October 2012. Retrieved 18 October 2012.